

Session 2A: Fish Ecology and Biology

Questions & Answers

Bill Mavros

Question not recorded.

Mavros: There's no difference in the way we did it. The efficiency isn't that great. We actually snorkeled the leading edge on both of those techniques and we noticed that the stomping of the feet of the pulling the nets scare more than 50 percent of the fish. It was interesting to see it, but the efficiency is so low on these beach seines due to from shore that we can't really quantify it statistically. I think is a good presence/absence measure, but to quantify it, we probably have to use different techniques.

Question not recorded.

A: We haven't tried that, that's on for next year, we are looking for different techniques. This was low budget, it wasn't like Dick Beamish's project up in Georgia Strait where he had lots of money and huge boat. That's for next year or the year after.

Q: Did you sacrifice the fish or especially chinook or let them go?

Mavros: No, we were very careful because this was an ESA project. Every time we caught chinook we separated them quickly into another bucket and they were the first fish more like a triage almost, and we got them out of the way right away.

Q: It seem like WDFW was clipping most of the hatchery fish, did you get any feedback on how many, what proportion were being clipped and that would give an indication about the difference between the unclipped and clipped fish that you saw there?

Mavros: We haven't got any numbers yet, but we're working on Kurt Fresh trying to get those numbers. That would be a good way to do it. I don't think our numbers are that robust this year. If we tried extrapolating from this we might get something, but I really don't trust these numbers and the techniques, etc.

Q: I was wondering what the implications of this work are for the standard "fish windows" for in-water work?

Mavros: Good question. The fish windows might be tightened on some places. What we don't know is where the fish are all the time and once we do some better work, and actually try to sample all these different areas, we get a better indication for where these fish are. If they are hatchery fish or if they are wild fish, that's again, a major implication. With a fish window, you really are looking at the wild fish. Hatchery fish, you can probably do work still.

Q: More of a suggestion, than a question. You may want to try to contact Skagit Systems Cooperative. (Remainder of question not recorded.)

Mavros: Well, there are some data, thanks for the suggestion. There has been other work done in the Skagit and B.C. and the Snohomish Basin that we have looked at, too. The data is kind of spotty in King County; there's some work being done on the piers. Bill Taylor has produced some work over there and for different mitigation studies, but it has not been concentrated on these beaches; it's just been specific areas so we are trying to gather that data, look at all the historical data and then try to decide where we want to sample for next year. So this was just a project that was put together on a short time frame to see if it would

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work in this area and if we could get funding and to see basically where the fish were. Any suggestions we could take we're taking them and we're trying to use them for next year.

Charles Eaton

Question not recorded.

Eaton: You know, we so rarely encounter rockfish. Occasionally we encounter juvenile brown rockfish but so that was one of the variables I didn't include in the sensitivity index just because of its rarity.

Q: I think this a great study. It's the best treatment of the fish ecology's data, looking at reference sites and contaminated sites that I have seen. My question is, in our big trawl surveys we do in Puget Sound, there's substantial variation in the net width opening as a function of depth and scope of the amount of line you let out, have you controlled for that or do you have any idea how that might affect the net width and your results as a function of depth and scope?

Eaton: Each stratum is of course, defined by depth, by a depth range, so we have a very narrow depth range and then for each increment in depth we have a slight increment in the amount of wire that is let out. So for actually each liter of depth we have a given scope of wire that we let out. And of course that varies a lot with the tide so sometimes we are going through considerable depth ranges. So we do compensate for scope and when the replicate sampling hopefully takes care of some of that other variability. We would like to have at least seven trawls per stratum.

Q: Are there any presumed contaminants that are thought to be responsible for the difference between near-field and far-field results that you have seen?

A: Yes, primarily heavy metals (mercury and lead) in Sinclair Inlet. In the *Puget Sound Update*, you'll see a figure in there that shows a gradient of mercury and lead contamination going from north to south or from near the shipyard toward to the town of Port Orchard. So the town of Port Orchard is on, don't get it confused with Port Orchard, the water body, it's on Sinclair Inlet.

Steven Fradkin

Q: Do you have any feeling whether the spawning population of the [specific beach] is actually is just one larger population along the coast so that the decreases at [the specific beach] spawning activities might be just that they spawn somewhere else?

A: That's a possibility. We don't have any data from the more southern populations. There is a fair amount of distance between Rialto Beach and some of the southern populations so I suspect that they may it may a distinct population or extinct subpopulation. Although, we are data limited there.

Q: I remember the understanding that what the Corps was dredging they were redepositing to Rialto Beach. Am I wrong?

A: No, that's actually correct. Although, their replenishment schedule has not been all that frequent. I'm aware of only one replenishment. The impetus to that study was to examine the effects of that replenishment and how to potentially change gravel size distribution on the beach. There is a right size fraction in there, how that weathers over time and that material then changes, certainly as you can see from the photo, that material migrates away. And migrates pretty much to the north along the beach there. So in terms of whether it's of the appropriate size and how it's actually affecting, you can see from the mean size data of appropriate size gravels, that it certainly doesn't seem to be affecting the beach as a whole over time, although a much finer analysis of this data might yield a different result.

Q: You had mentioned that there has been one survey per distribution and that you have one year's worth of data on that, do you expect that you would be able to do that a few more times to gather more than one year of distribution data?

A: I agree that a repeat of that survey would be quite desirable and that, I wouldn't say that is planned in the next several years, that is in the scope of work that we have in terms of thinking about future surf smelt work. In particular, we are interested in some more of the northern beaches on why there isn't surf smelt activity there and to verify whether there is or isn't.

Dan Penttila

Q: What benefits might there be to nourishment to some of these older bulkheads, where essentially the beach has been eroded and we no longer have the sand substrates?

A: Beach nourishment experiments are being undertaken, some in the context of preserving surf smelt spawning habitat in the course of the nourishment project. Jim Johannesen and I worked together on things like that and we have more projects possibly in the works, little pilot studies and things. But beach nourishment is going to have to be a way to go if we want to preserve upper intertidal sandy beaches or significant parts of Puget Sound. But on the other hand, we have to let the caveat that there's a lot of research yet that has to be done to prove that the beaches are deflating first. It's a presumption I think that the beaches are deflating, we have some certain sites that looks like they have deflated but we need more work in that region, both at surf smelt spawning beaches, which comprise about 10 percent of the shoreline of the Puget Sound basin, and other sandy gravel beaches elsewhere along the shorelines that so far, the fish have not chosen to use, but the same sort of information needs to be gleaned.

Question not recorded.

A: The mean Sunny Mortality was 60 percent, the mean Shaded Mortality was 36 percent, with a wide variation. A lot of things can happen to eggs even in the shady places during the course of their two-week summer incubation period. Drying winds can desiccate the eggs, even in shady places. It's a highly variable situation, so we are talking about trends here over a long period of time to make a difference. And that's why I think the fish haven't evolved yet to aim just at shady places. I don't think they do that. It's a matter of putting all your eggs on the beach, and some are hid in a shady place and some hid in a sunny place and the species goes on. There's places in the Puget Sound and the outer coast where there is no shade and never has been, and I think the fish get around that by being in high-wave action places where there's a deeper motile layer of material on the beach that some of their eggs will get down to so even if the sun bakes the surface surfers inch or two, there's a reservoir of a cooled spawn down below. I think in Bellingham Bay that might be the case and certainly on the straits and the outer coast. In this situation where the spawn-bearing layer of the beach may be over a foot thick in terms of the motile, how deeply the eggs are distributed in the substrate. But in some of these other places where there is a very low-wave action, an egg may incubate in a surface inch of the beach material, which is what we sampled. It's entire two-week incubation period without opportunity to go deeper and so it appears to be important.

Question not recorded.

A: Smelt will ignore large woody debris. Generally, they spawn just down of the beach drift logs zone, but they will spawn in amongst the fallen branches of trees that have collapsed on the beach. It doesn't seem to deter their spawning activity, and they do wave to and fro along the shoreline before they choose a place to spawn. Why spawning is triggered more at one place than another, we do not know, but they seem to be adapted to steering around landslides and blow-downs and things like that. It's all part of the natural environment that they have chosen to spawn to use for spawning.

Question not recorded.

A: That picture depicted a belt of armored shoreline where the sediment supplies have been cut off and it may have all the problems of deflation down the way in time, perhaps decades or hundreds of years from now but I think we do have to think in terms Puget Sound habitats, what is Puget Sound going to look like in 500 years? Hopefully, it's still supporting marine life of some kind. Perhaps Jim Johannesen could talk to you about the physics of waves and sediments on vertical surfaces. There is supposedly an impact, a scouring of beach sediments in the face of a vertical wall versus a rough slope where wave action behaves differently. But I'm afraid I don't know the physics behind it, but it is a concern.